ABDULLAH GÜL UNIVERSITY

CLIMATE CHANGE AND WASTE MANAGEMENT SYSTEM

Activity: Personal Reflection II

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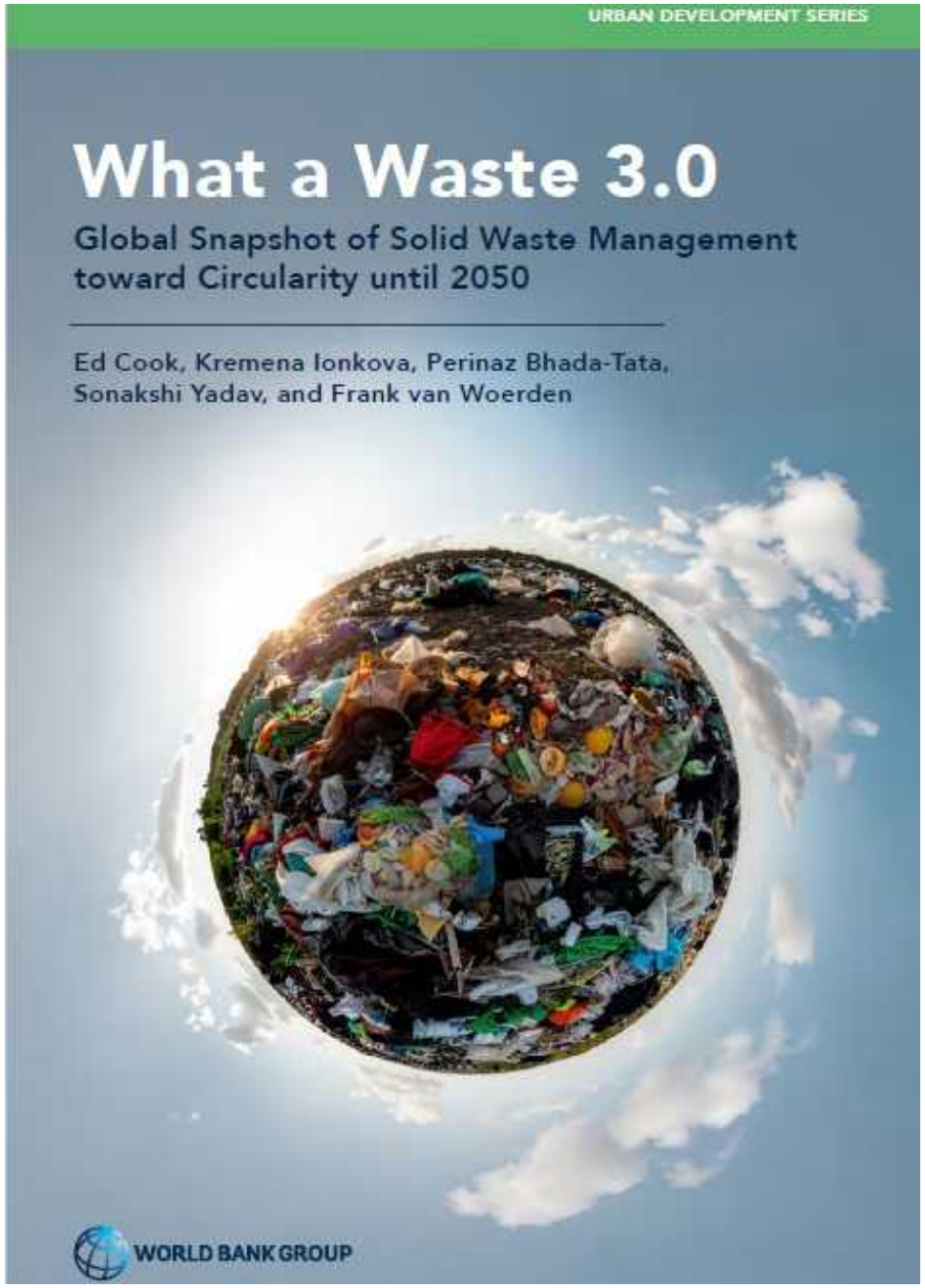
According to the **UN Environment Programme (UNEP)** and associated international frameworks, waste comprises substances or objects which are disposed of, intended to be disposed of, or required to be disposed of by law. It covers solid, liquid, and gaseous materials resulting from production, daily life, or other activities.

Key Aspects of the UNEP Waste Definition

Action-Oriented: Waste is defined by its disposal, intended disposal, or discard, often arising from human activity (production, consumption, and daily life).

Exclusions: Generally, this excludes materials that are directly reused or recycled at the place of generation rather than discarded.

Types of Waste Recognized:
Municipal Solid Waste (MSW): Household waste, including waste from shops, offices, and schools.
Hazardous Waste: Materials containing toxic, corrosive, or reactive substances (e.g., e-waste containing mercury, lead, or chemicals from the Stockholm Convention).
Special Waste Streams: Including agricultural waste, medical waste (e.g., masks, contaminated items), and mining waste.



WORLD BANK GROUP

Tokyo Development Learning Center

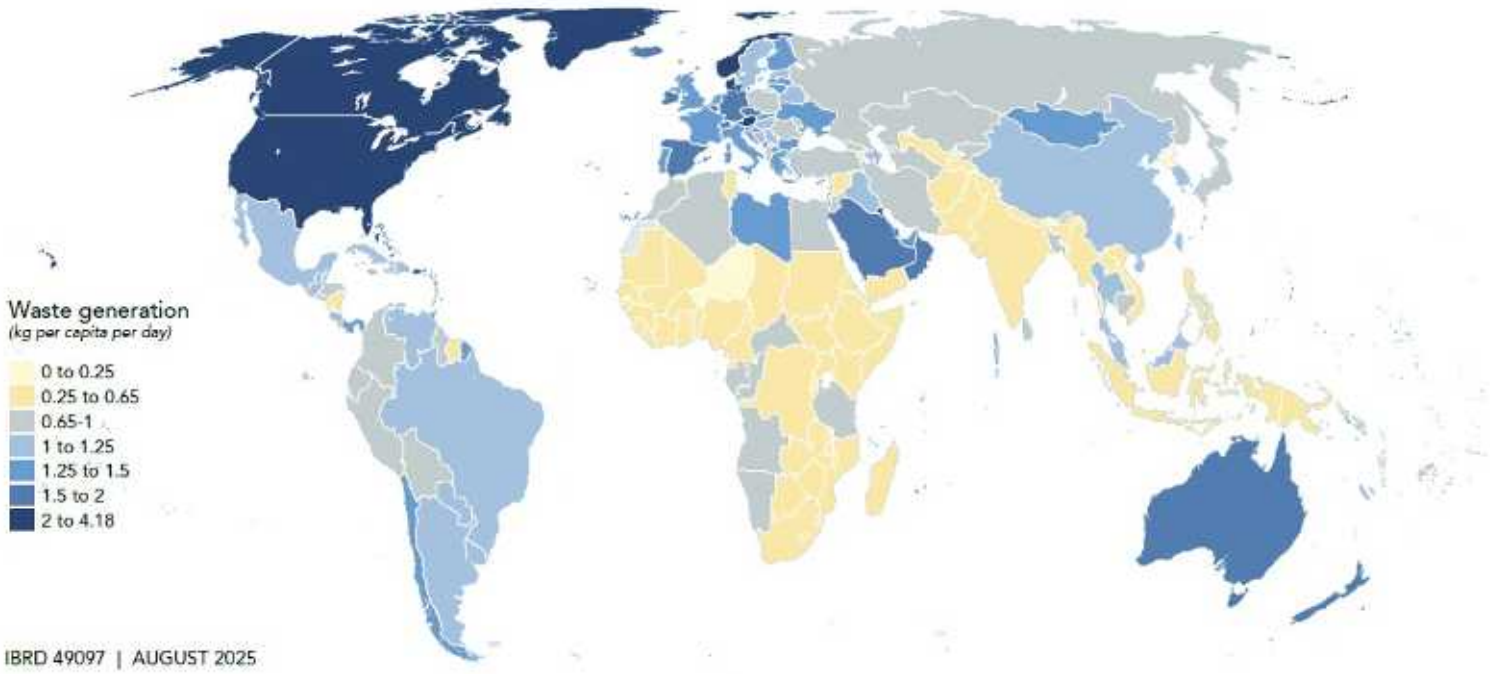
JAPANGOV
THE GOVERNMENT OF JAPAN

CARBON PARTNERSHIP FACILITY

City Climate Finance Gap Fund

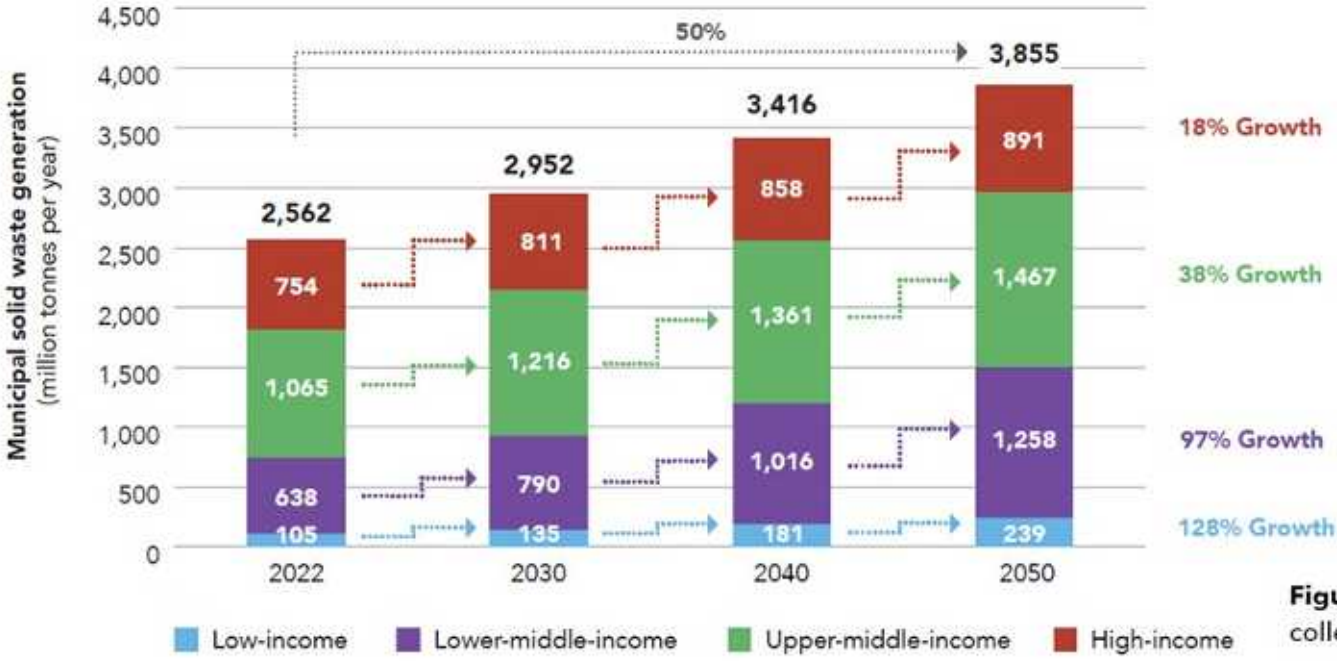
PROBLUE

Map 2.1 Waste generation by country



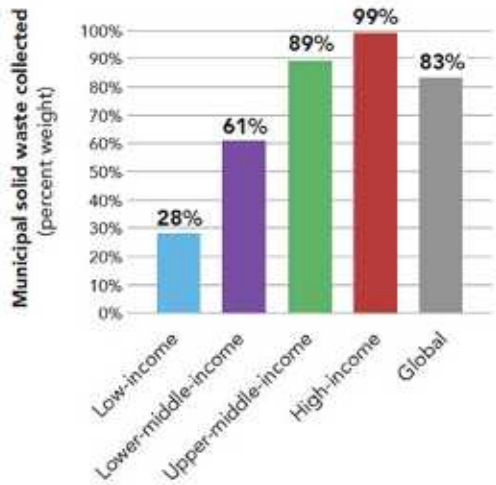
Source: Original map for this report.
Note: Country dataset. National mean waste generation in kilograms per capita per day, projected to 2022.

Figure S.1 Projected waste generation by income group



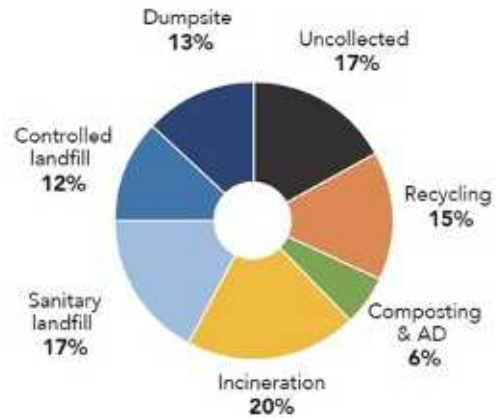
Source: Original figure for this report.
Note: Growth rates in colored text show proportional increase in waste generation between 2022 and 2050.

Figure S.2 Municipal solid waste collection rates by income group



Source: Original figure for this report.
Note: Mean collection coverage (percent, weighted by the total mass of waste collected in each income group in 2022).

Figure S.3 Global municipal solid waste treatment and disposal



Source: Original figure for this report.
Note: Mean treatment and disposal (percent, weighted by the total mass of waste generated in 2022).
AD = anaerobic digestion.

Figure S.4 Municipal solid waste treatment, disposal, and uncollected waste by region

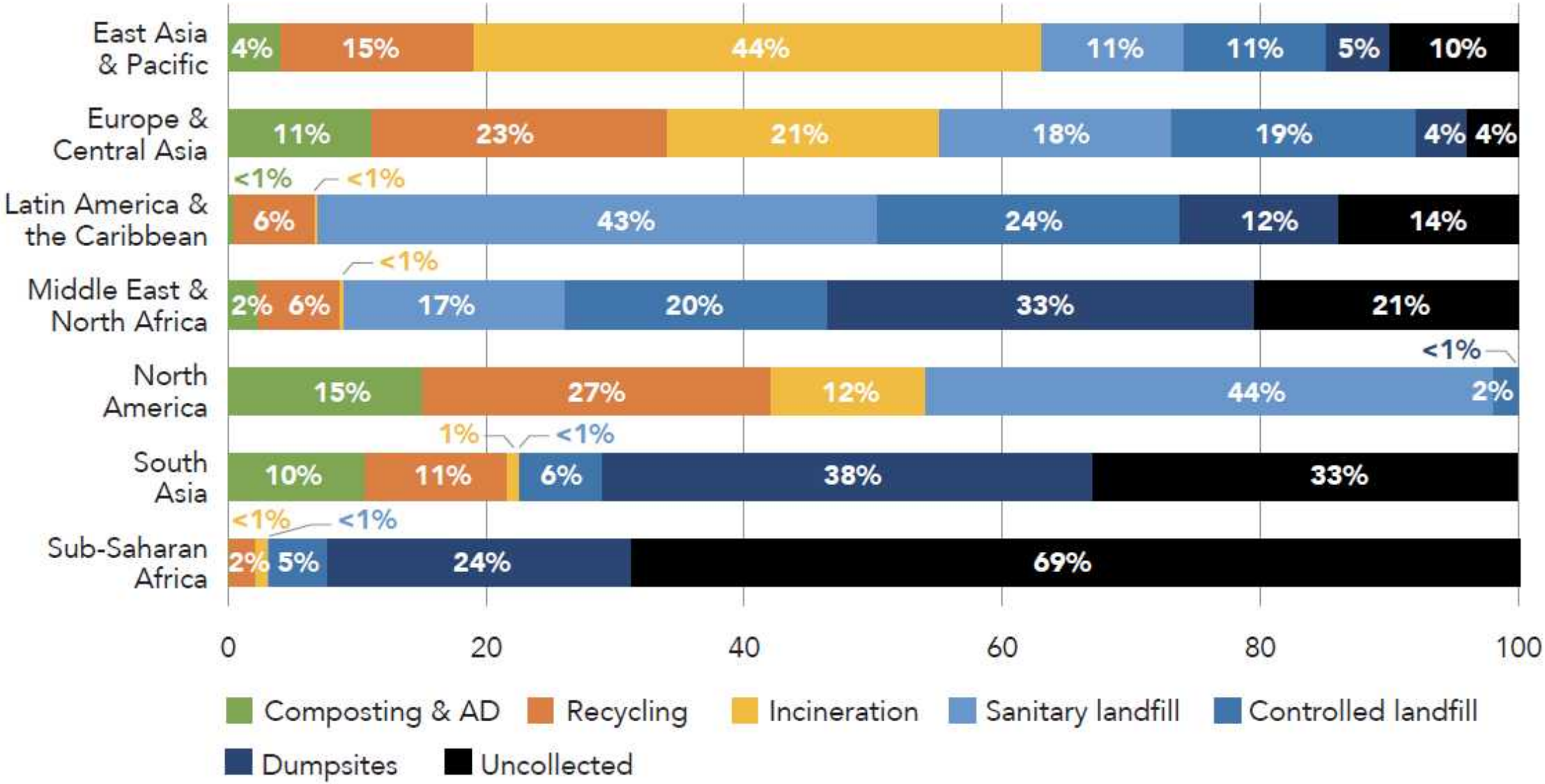
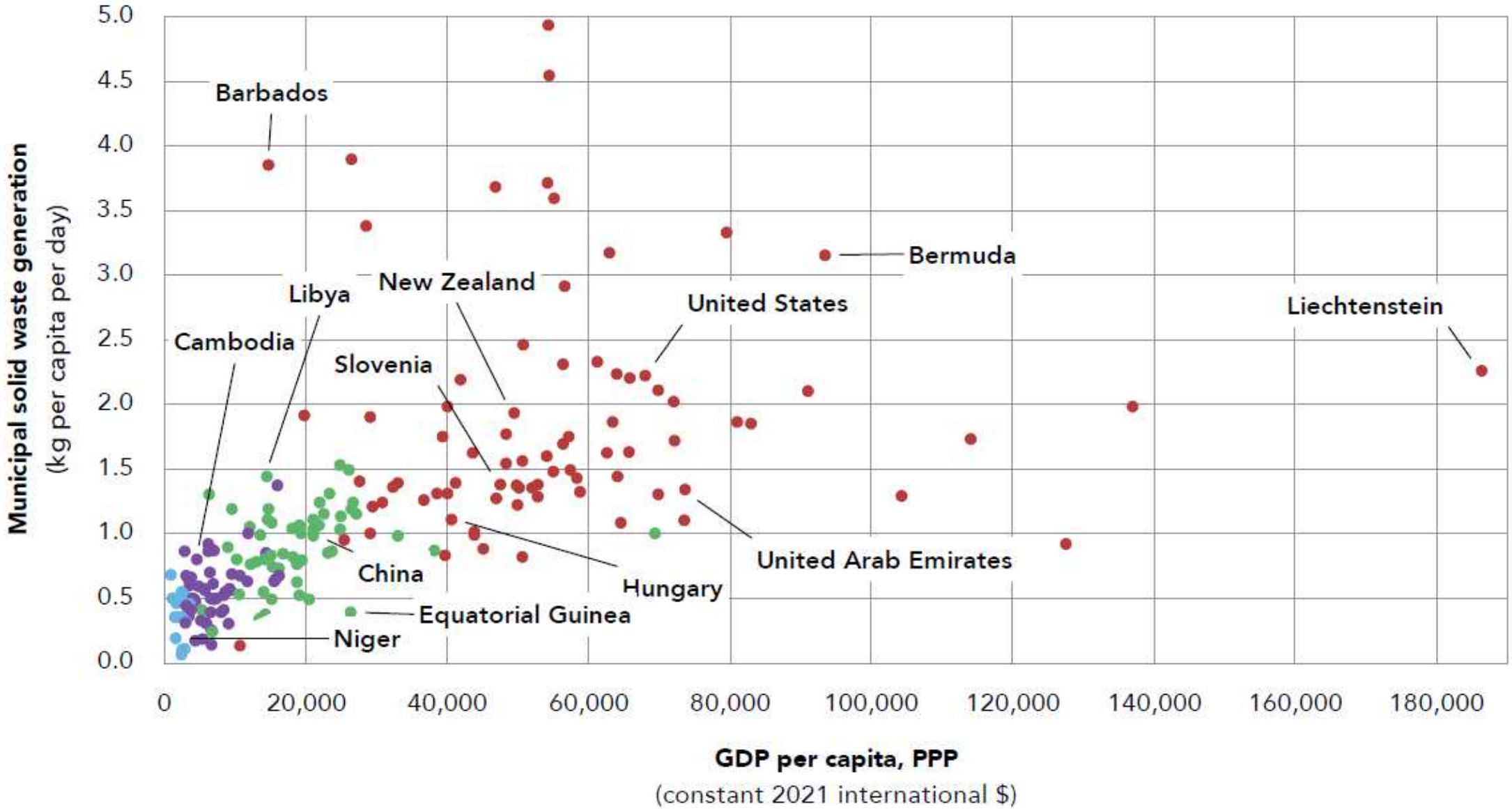
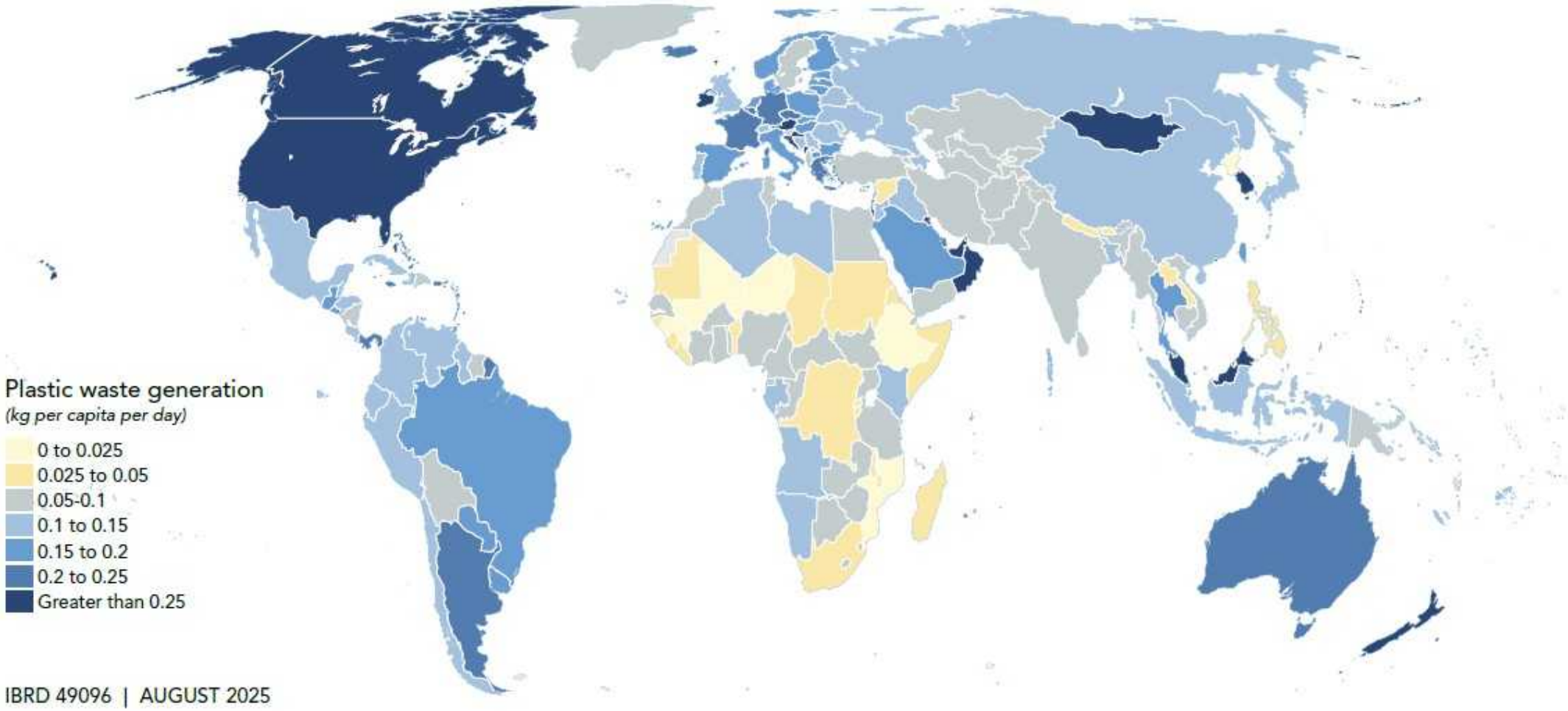


Figure 2.2 Correlation between waste generation and GDP per capita, PPP



Map 2.2 Municipal solid waste plastic generation



Source: Original map for this report.
Note: Municipal solid waste plastic generation in kilogram per capita per day in 2022.

Climate Change

What is climate change?

Climate change is a change in the state of the climate that can be identified (e.g., by using statistical tests) by changes in the mean and/ or the variability of its properties and that persists for an extended period, typically decades or longer.

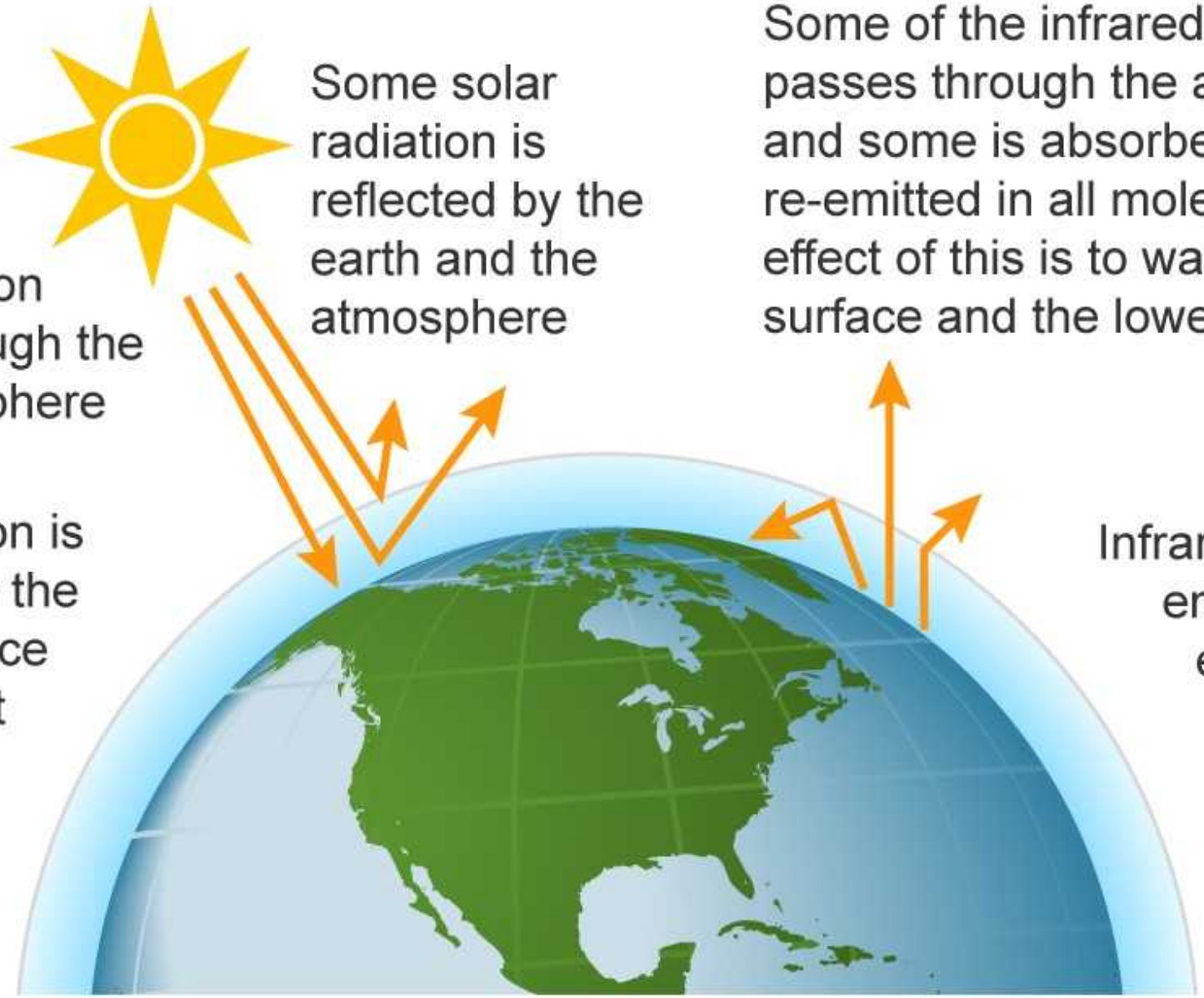
A complete definition is available in the Glossary of the Working Group I contribution to the Sixth Assessment Report (page 2222).

What causes climate change?

Climate change may be due to natural internal processes or external forcings such as modulations of the solar cycles, volcanic eruptions and persistent anthropogenic changes in the composition of the atmosphere or in land use.

Source: Glossary of the Working Group I contribution to the Sixth Assessment Report (Page 2222 under the definition of Climate Change)

The greenhouse effect



Some solar radiation is reflected by the earth and the atmosphere

Some of the infrared radiation passes through the atmosphere, and some is absorbed and re-emitted in all molecules. The effect of this is to warm the earth's surface and the lower atmosphere.

Solar radiation passes through the clear atmosphere

Most radiation is absorbed by the earth's surface and warms it

Infrared radiation is emitted from the earth's surface

Greenhouse gases (GHGs) are gases in Earth's atmosphere that trap heat. They allow sunlight to pass through the atmosphere to warm the planet's surface, but they absorb the infrared radiation (heat) that the Earth tries to radiate back into space. This process, known as the greenhouse effect, acts like a thermal blanket or the glass walls of a greenhouse, keeping the Earth warm enough to support life.

Common Greenhouse Gases

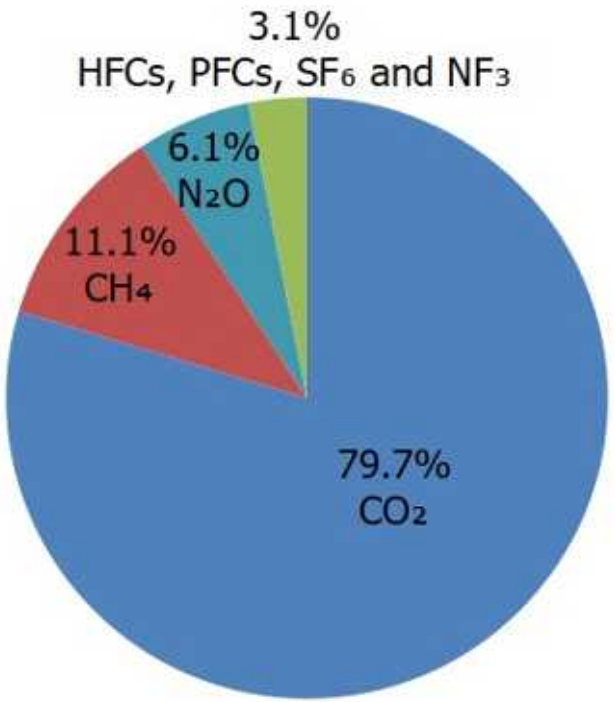
Water Vapor : The most abundant natural greenhouse gas; its concentration increases as the atmosphere warms.

Carbon Dioxide : Released through natural processes like respiration and volcanic eruptions, but primarily through human activities like burning fossil fuels and deforestation.

Methane: More potent at trapping heat than , it comes from livestock, rice farming, landfills, and natural gas production.

Nitrous Oxide: A powerful gas emitted from agricultural fertilizers, industrial activities, and fossil fuel combustion.

Fluorinated Gases: Entirely man-made synthetic gases (like HFCs and PFCs) used in refrigeration and manufacturing. They have extremely high Global Warming Potential (GWP).



WORLD METEOROLOGICAL ORGANIZATION

Climate change

CHALLENGES

Climate change is the term used to describe changes in the state of the climate that can be identified by changes in the average and/or the variability of its properties and that persists for an extended period, typically decades or longer.

1.55°C

The global mean near-surface temperature in 2024 was 1.55 ± 0.13 °C above the 1850-1900 average.

2024

The warmest year in the 175-year observational record, beating the previous record set only the year before.

90%

The ocean absorbs approximately 90% of energy in the climate system, warming it to record levels in 2023.

113mm (4.4 in)

In 2024, global mean sea level reached a record high in the satellite record (from 1993 to present).

The Conference of the Parties (COP) is the supreme decision-making body of the United Nations Framework Convention on Climate Change (UNFCCC), where nations meet annually to negotiate actions to limit global climate change. Comprising representatives from all member states, the COP assesses progress and adopts binding agreements or policies to combat environmental crises.

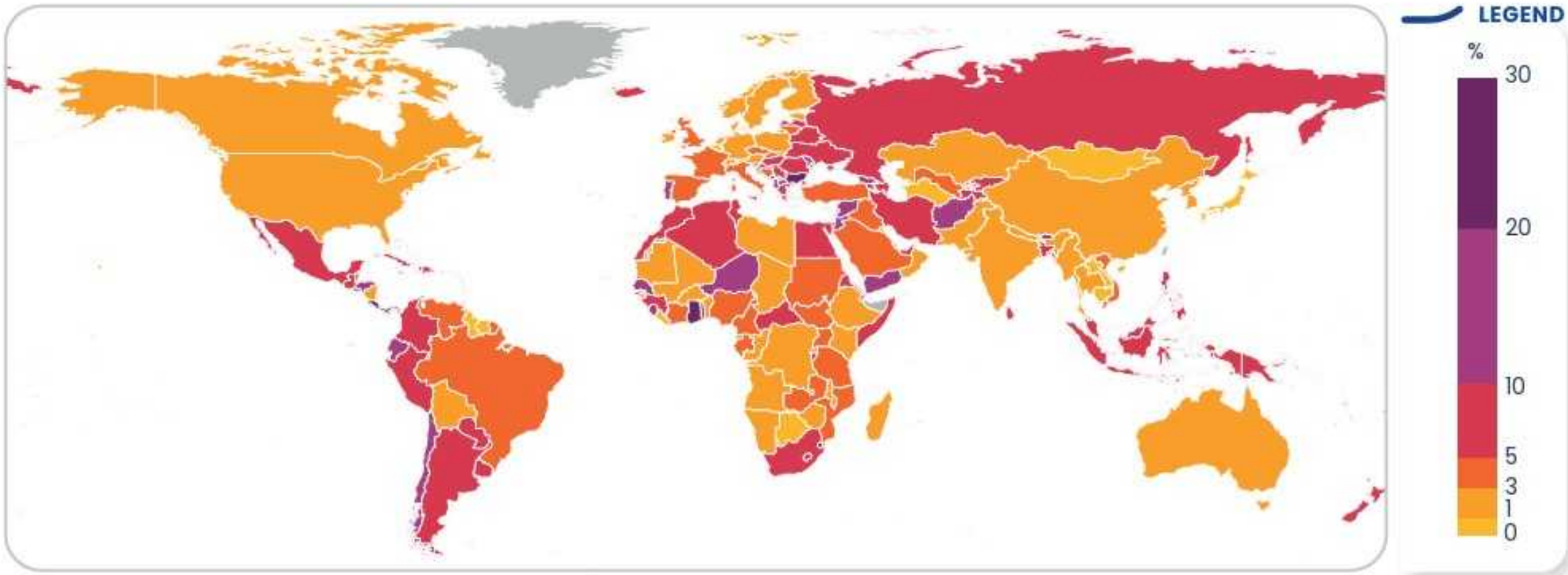
WASTE & CLIMATE CHANGE

Atlas on Waste Management and Climate Change Mitigation

FOCUS ON INTEGRATING
WASTE INITIATIVES INTO NDCs

MAP 1

Share of greenhouse gas emissions from the waste sector in total emissions, 2021



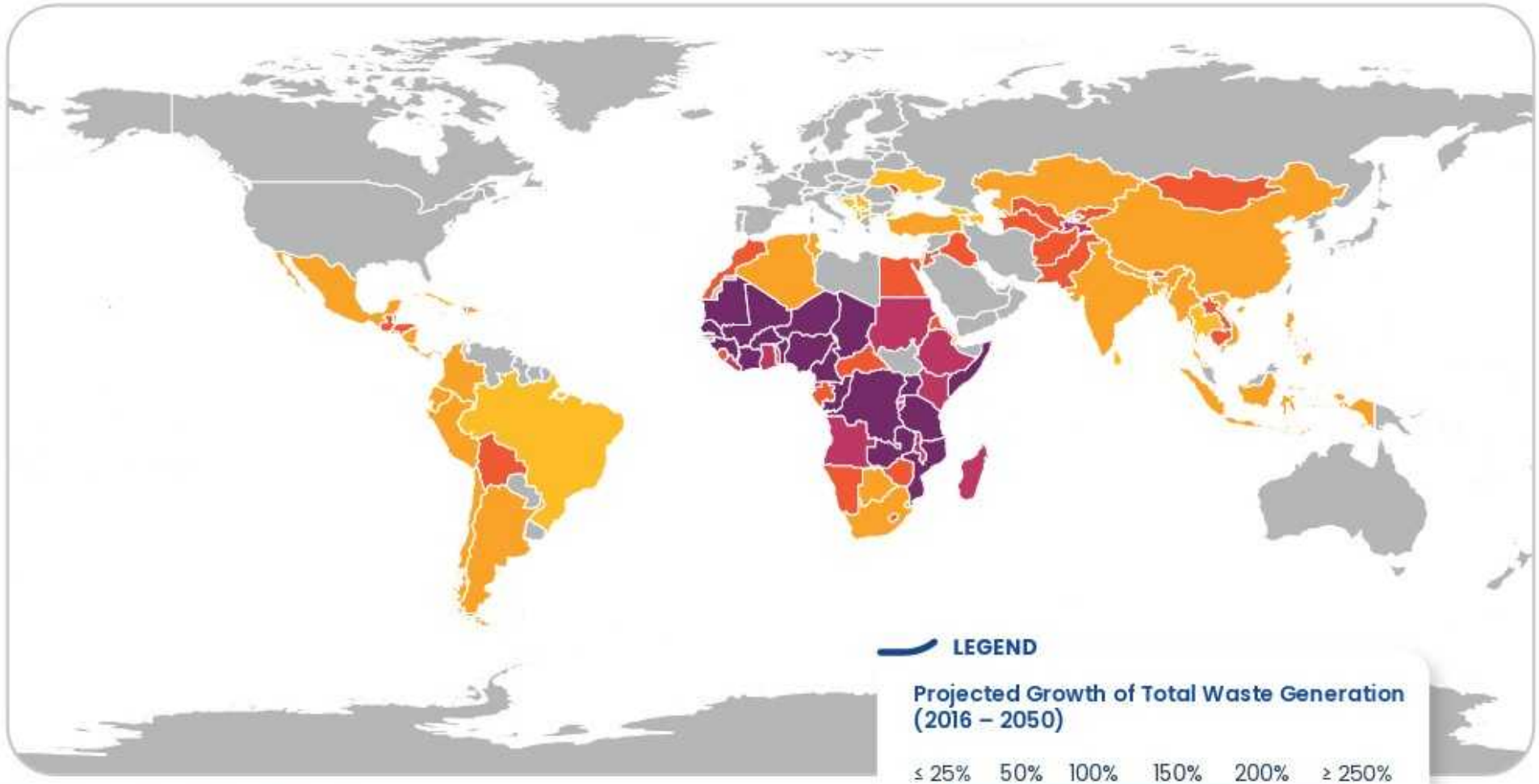
Source: Climate watch.

[14] UNEP (2024), *Global Waste Management Outlook 2024: Beyond an Age of Wast*, p109.

[15] Climate watch, Historical emissions, https://www.climatewatchdata.org/data-explorer/historical-emissions, accessed on 03 April 2025.

MAP 6

Projected growth in waste generation between 2016 and 2050



Source: AFD calculation, see Annex 3.

Waste management archetype and developments to reduce emissions

Build the Basics (BtB)

- No or limited actions taken to reduce waste generation
- Low to medium waste collection rates
- Limited or no source-separated organics or recycling
- Limited or no waste treatment
- Waste is disposed of at dumpsites
- Illegal dumping and open burning of waste are common

Build the Basics Plus (BtB+)

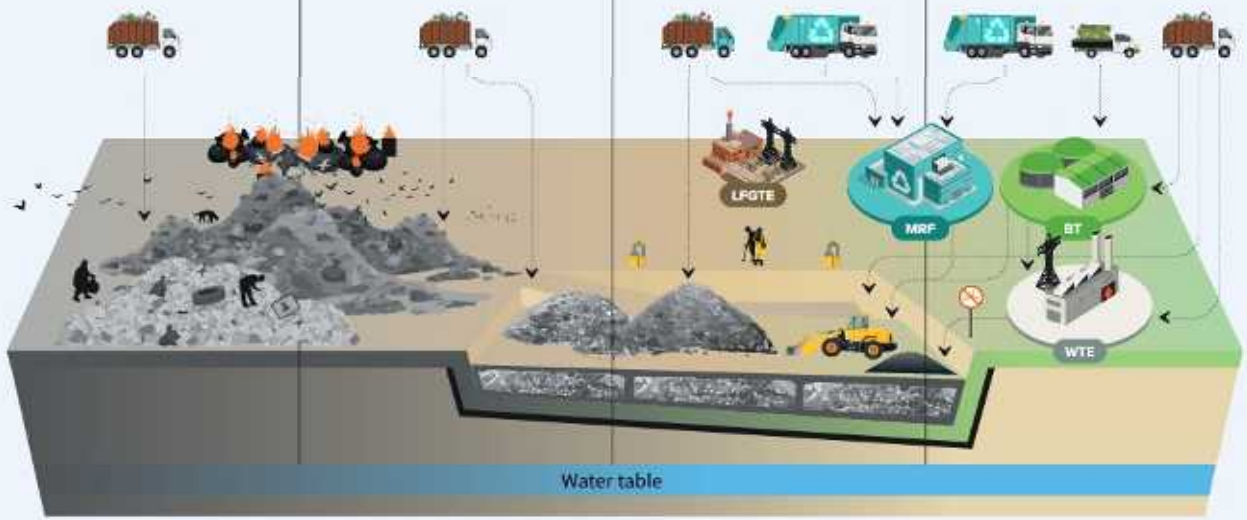
- Some actions taken to reduce waste generation
- Higher waste collection rate than BtB
- Limited or no source-separated organics or recycling
- Limited waste treatment
- Transitioning from dumpsites to sanitary landfills
- Illegal dumping and open burning of waste may occur

Move up the Hierarchy (MuH)

- More actions taken to reduce waste generation than BtB and BtB+
- Universal or near-universal waste collection
- Higher source-separated organics and recycling rates than BtB and BtB+; source-separated organics is still relatively limited compared to CtC
- Waste treatment and material recovery facilities are common
- Waste is disposed of in sanitary landfills
- Methane emissions monitoring and capture may occur

Close the Circle (CtC)

- Extensive actions taken to reduce waste generation
- Universal or near-universal waste collection
- In most CtC countries, source-separated organics and recycling rates are higher than in BtB and BtB+ countries and source-separated organics is mandated by law
- Most CtC countries have banned biodegradable waste from landfills
- Biological treatment and incineration of waste are common
- Least reliant on landfills



Waste collection, treatment, and disposal activities occur at different sites. Note that the primary outputs from the materials recovery facility and the biological treatment plant (e.g., plastics and biogas) are not depicted. The graphic has been simplified for illustrative purposes.

LEGEND

WTE : Waste To Energy
BT : Biological Treatment
MRF : Materials Recovery Facility
LFGtE : Landfill Gas to Energy Process Works

Source: Adapted from "A Playbook for Municipal Solid Waste Methane Mitigation. Recommendations Based on Global Waste Management Archetypes," RMI 2024.

THANK YOU FOR YOUR ATTENTION…